

Cheyenne, Wyoming, 16th.
Uncompahgre, Colorado, 16th.
Genoa, Nebraska, 17th.
Red Bluff, California, 24th.
Fort Canby, Washington Territory, 27th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various states and territories on the following dates:

Arkansas.—Lead Hill, 10th, 13th, 16th, 23d, 28th.
California.—San Francisco, 3d, 7th, 11th, 27th, 31st; Poway, 22d; Cape Mendocino, 30th.
Dakota.—Fort Buford, 9th, 27th; Webster, 12th, 19th, 20th.
Florida.—Key West, 5th, 8th, 14th; Archer, 13th, 30th.
Georgia.—Augusta, 15th, 20th.
Illinois.—Cairo, 11th; Polo, 17th, 18th; Chicago, 30th.
Kansas.—Holton, 7th; Independence, 10th; Yates Centre, 10th.
Maine.—Cornish, 23d; Gardiner, 23d.
Massachusetts.—Provincetown, 23d.
Michigan.—Swartz Creek, 4th; Marquette, 9th; Grand Haven, 24th.
Minnesota.—Northfield, 4th.
Nebraska.—Johnson, 7th.
Nevada.—Carson City, 27th.
New Hampshire.—Grafton, 3d; Mount Washington, 8th, 23d.
New York.—Palermo, 28th.
North Carolina.—Fort Macon, 11th; Cape Lookout, 28th.
Ohio.—Wauseon, 3d, 4th; Toledo, 4th.
Tennessee.—Chattanooga, 4th; Nashville, 28th.
Texas.—Indianola, 21st; Palestine, 23d; Fort Davis, 31st.
Utah.—Salt Lake City 19th.
Vermont.—Lunenburg, 10th, 30th; Strafford, 23d.
Virginia.—Variety Mills, 27th, 28th.
Wisconsin.—Manitowoc, 4th.

LUNAR HALOS.

Lunar halos have been observed in the various states and territories on the following dates:

Alabama.—Auburn, 11th, 15th; Mobile, 15th.
Arizona.—Prescott, 12th; Fort Apache, 21st.
Arkansas.—Lead Hill, 10th; Fort Smith, 10th, 12th.
California.—Los Angeles, 11th, 16th, 21st; San Diego, 20th, 22d.
Colorado.—Uncompahgre, 12th.
Dakota.—Webster, 9th; Fort Bennett, 10th; Fort Meade, 13th.
Florida.—Limona, 12th, 14th.
Georgia.—Augusta, 12th; Atlanta, 18th.
Illinois.—Cairo, 8th, 9th, 10th, 13th, 17th, 18th; Chicago, 10th, 17th; Polo, 10th; Riley, 10th; Springfield, 10th, 16th.
Indiana.—Wabash, 9th, 17th.
Iowa.—Humboldt, 10th; Dubuque, 16th; Guttenburg, 16th; Manchester, 16th; Monticello, 16th; Indianola, 17th.
Kansas.—Yates Centre, 8th, 10th; Independence, 10th; Fort Scott, 10th, 17th; Clay Centre, 14th.
Kentucky.—Frankfort, 12th; Louisville, 12th.
Maine.—Gardiner, 8th; Eastport, 18th.
Massachusetts.—Boston, 8th; Dudley, 8th.
Michigan.—Alpena, 11th; Port Huron, 12th; Kalamazoo, 16th; Swartz creek, 17th.
Minnesota.—Saint Paul, 12th.
Mississippi.—Vicksburg, 8th.
Missouri.—Curryville, 19th.
Nebraska.—Johnson, 7th.
Nevada.—Carson City, 11th.
New Hampshire.—Mount Washington, 8th.
New Jersey.—Freehold, 8th, 9th, 11th, 16th; Moorestown, 10th, 25th; Barnegat City, 14th, 19th, 20th.
New York.—Menand Station (near Albany), 9th.
North Carolina.—Cape Lookout, 9th, 10th; Fort Macon, 11th.

Ohio.—Columbus, 11th; Cincinnati, 12th; Wauseon, 18th.
Oregon.—Portland, 15th.
Pennsylvania.—Fallsington, 11th; Chambersburg, 30th.
Tennessee.—Milan, 12th; Memphis, 13th.
Texas.—Galveston, 3d, 7th, 17th; Indianola, 4th to 8th, 10th, 11th, 12th, 15th, 16th, 18th; Fort Stockton, 10th, 15th, 16th.

Utah.—Salt Lake City, 18th, 19th, 25th.

Vermont.—Strafford, 10th.

Virginia.—Norfolk, 10th; Wytheville, 10th; Johnstown, 12th, 13th.

Washington Territory.—Spokane Falls, 9th; Fort Canby, 10th, 23d; Dayton, 11th, 12th.

Wisconsin.—Franklin, 8th; Grand Haven, 10th; Milwaukee, 14th; Beloit, 14th, 16th; La Crosse, 16th.

MIRAGE.

Indianola, Texas, 20th, 25th, 30th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and fifty-two stations show 4,610 observations to have been made, of which twenty-one were reported doubtful; of the remainder, 4,589, there were 3,852, or 83.9 per cent., followed by the expected weather.

SUN SPOTS.

The following record of sun spots for the month of October, 1883, has been forwarded by Professor D. P. Todd, Director of the Lawrence observatory, Amherst, Massachusetts:

Date— Oct., 1883.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 4 p. m.	2	2					2	2	
3, 10 a. m.	1	3	0	0			3	5	
4, 9 a. m.	0	4	1	1	0	0	2	8	
5, 12 m.	2	6	0	0	1	2	4	13	
6, 3 p. m.	1	1	0	0	1	1	5	14	
7, 4 p. m.	2	15	0	0	1	5	7	30	Also veiled spots.
8, 10 a. m.	0	0	1	1	0	0	0	30	
9, 3 p. m.	1	15	0	0	1	1	7	45	
10, 12 m.	0	20	0	0	0	0	7	70	
11, 11 a. m.	1	15	0	0	0	0	8	85	Two of spots quite large.
13, 12 m.	1	10			1	10	5	65	
14, 2 p. m.	0	5	0	0	0	5	5	70	
15, 10 a. m.	2	10	0	5	0	0	7	75	
16, 3 p. m.	0	0	1	5	0	0	6	70	
17, 12 m.	0	0	0	10	0	0	6	60	
18, 4 p. m.	0	0	2	25	0	0	4	30	
22, 5 p. m.	1	2					3	15	
28, 10 a. m.							7	50	
30, 2 p. m.	0	0	2	15	0	0	5	35	
31, 3 p. m.	1	2	0	0	1	2	6	35	

Faculae were seen at the time of every observation. 1 Approximated.

Mr. William Dawson, of Spiceland, Indiana, observed sun-spots during October as follows:

1st.—Two groups, four spots, three of which were near the east edge; all prominent; air very poor.

7th.—Seven groups, sixty-five spots; a large oblong spot near east edge; a row of groups across the sun.

8th.—Seven groups, seventy-one spots; much faculae.

9th.—Six groups, one hundred and thirty-five spots; many of the latter were large. Eighty-eight spots were counted with 50 eye-piece.

13th.—Six groups, seventy (?) spots, observed with 50 eye-piece through cloud.

14th.—Six groups, ninety spots, observed with 50 eye-piece. Two large groups were near the west side, and one near the east edge.

15th.—Six groups, one hundred and fifty spots, observed with 100 eye-piece. There were sixty-five spots in one group near the west edge.

19th.—One spot was distinctly seen through cloud without the telescope.

25th.—Five groups, ninety spots; condensed group of sixty-four small spots west of the centre; one large spot at east edge.

30th.—Eight groups, eighty spots; three large spots near the centre.

Mr. H. D. Gowey, of North Lewisburg, Ohio, reports that sun spots were observed by him on all clear days during the month. They were least numerous on the 1st; most numerous on the 9th; largest on the 16th; and smallest on the 3d.

METEORS.

Fort Grant, Arizona.—A brilliant meteor appeared in the southeastern sky at 7.25 p. m. of the 13th.

Springfield, Illinois.—On the evening of the 13th a brilliant meteor appeared in the eastern sky at an altitude of 45° , and passing northward it exploded when about 30° above the northeastern horizon. At 7.20 p. m. of the 16th a large and brilliant meteor was observed to pass from near the zenith toward the northeastern horizon.

Stateburg, Sumter county, South Carolina.—A brilliant meteor was seen in the eastern sky at about midday of the 20th. Its course was from south to north, being considerably inclined toward the earth. It left a long, bright train which remained visible for several seconds.

Woodstock, Windsor county, Vermont.—At 9 p. m. of the 22d a meteor was observed in the northeastern sky near "Capella," and passing in a northerly direction, disappeared when about 30° above the horizon.

San Francisco, California.—A meteor was seen here at 2.55 a. m. of the 25th, passing from southwest to northeast, accompanied by a peculiar noise, and leaving a yellowish trail.

Mount Washington, New Hampshire.—A very brilliant meteor was observed at this station at 11.20 p. m. of the 26th in the southeastern sky at an altitude of 15° , and falling slowly it disappeared behind a bank of cloud.

Phoenix, Arizona.—A meteor was observed here at 10 p. m. of the 29th. Its path extended from east to west almost parallel to and about 50° above the southern horizon.

Spokane Falls, Washington Territory.—A very bright meteor was seen at 10.30 p. m. of the 29th, passing from east to west. It was visible for about fifteen seconds, and the light produced by it was so bright that a newspaper might have been read by it; signs were read at a distance of one hundred feet.

Nashville, Tennessee, 29th.—A bright meteor was seen here at 6.55 p. m. of the 29th. It started from a point near the zenith, and passed to within 15° of the southwestern horizon, leaving a path which remained visible seven seconds. At 12.05 a. m. of the 30th, another meteor of unusual brightness was seen by many persons in this city. Its course was from 10° southwest of "Polaris" to within 15° of the southeastern horizon. It illumined the whole heavens, and left in its path a wide streak of light, which remained visible for fifteen seconds.

Wytheville, Wythe county, Virginia.—A fine meteor of blueish-white color was observed here during the early morning of the 30th.

Sussex, Waukesha county, Wisconsin.—At 4.30 a. m., of the 30th, a brilliant meteor was seen in the northern sky; it moved downward in an easterly direction, and left behind it a broad trail which remained visible for several seconds.

Chambersburg, Franklin county, Pennsylvania.—A brilliant meteor was observed at this place on the evening of the 30th. It started from the zenith and passed to within 10° of the horizon, where it exploded.

Variety Mills, Nelson county, Virginia.—At 9.40 p. m., of the 30th, an unusually large meteor was observed in the northwestern sky at an altitude of about 22° . It passed toward the horizon, changing in color from pink to pale green. Before disappearing, the meteor exploded, lighting up the sky like distant lightning.

Augusta, Georgia.—At 6.45 p. m., of the 30th, a meteor was seen in the eastern sky at an elevation of 60° , and moving southward it left a luminous trail which remained visible for

five seconds. At 9 p. m., two meteors were observed in the western sky, both pursuing the same course from a point about 70° above the western horizon, and disappeared in the north.

Chattanooga, Tennessee.—At 12.15 a. m. of the 31st, a meteor of unusual brilliancy appeared in the northern sky. The meteor resembled a ball of fire with an apparent diameter of about thirty inches. It fell almost perpendicularly, leaving a streak of light which remained visible for five minutes. Before reaching the horizon the meteor exploded, scattering scintillations in all directions.

Webster, Day county, Dakota.—At 10.30 p. m. of the 31st, a meteor of remarkable brilliancy was seen in the northeastern sky. It first appeared near "Aldebaran" and disappeared near "Alpha" leaving behind it a long, wide trail. The nucleus was apparently nearly equal in size to the sun's disc, and was intensely bright.

Other meteors, of less brilliancy, have been reported during the month as follows:

1st.—Lead Hill, Arkansas.

2d.—Humphrey, New York, and Woodstock, Maryland.

7th.—Lead Hill, Arkansas, and Yuma, Arizona.

8th.—Lead Hill, Arkansas, and Johnson, Nebraska.

10th.—Brevard, North Carolina.

19th.—Woodstock, Maryland.

21st.—North Volney, New York.

22d.—Fort Canby, Washington Territory.

24th.—Woodstock, Maryland.

25th.—Yuma, Arizona.

27th.—Allison, Kansas.

28th.—Lead Hill, Arkansas, and Andersonville, Georgia.

29th.—Lead Hill, Arkansas; Archer, Florida; Ames and Humboldt, Iowa; Fort Scott, Kansas; Woodstock, Maryland.

30th.—Archer, Florida; Griffin Station, Indiana; Grand Coateau, Louisiana; Fall River, Massachusetts, and Moorestown, New Jersey.

31st.—Logansport, Indiana; Fort Scott, Kansas; and Variety Mills, Virginia.

EARTHQUAKES.

San Francisco, California.—At 11.03 p. m. of the 9th, two light shocks of earthquake were felt in this city and in the surrounding country. The vibrations, which were of about two seconds' duration, appeared to be from north to south.

At 1.02 a. m. of the 10th, another shock occurred which is considered to have been the severest that has been experienced here since 1868. It was sufficient to awaken persons from sleep, and caused considerable alarm. The timbers of buildings creaked, chandeliers swayed to and fro, ornaments were displaced, and crockery broken. The vibration was from north to south and was of several seconds' duration. This shock was also felt on the vessels in the harbor, and in various parts of California. It is reported to have been severest at points opposite this city on San Francisco bay. At Oakland the rumbling noise accompanying the shock was very loud and prolonged, and the vibrations were from west-northwest to south-southeast. Two light shocks were also felt at Oakland on the morning of the 30th; the oscillatory movement appeared to be from north to south.

The following cable reports were published in the "New York Herald," of October 13, 1883:

London, England, October 13th.—The shocks of earthquake at Irkutsk, Siberia, about which report was received yesterday, occurred at 11 o'clock on Tuesday (9th) night. The shock was slight.

Two shocks of earthquake were felt at Agram, Austro-Hungary, and at Zagora, Turkey, on Thursday (11th) evening.

The following extract is taken from "Nature" of October 11, 1883:

A telegram received at Paris on Tuesday (9th) night from Algiers states that a strong shock of earthquake was felt at Philippeville at half past one o'clock that morning. The oscillation was in the direction from north to south. At Jammasses the church and barrack walls were cracked; at Stora a house was also damaged.

Constantinople, Turkey, October 17.—On Tuesday (16th) an

earthquake occurred in Anatolia, the peninsula forming the western extremity of Turkey in Asia, which destroyed many villages in that region. The first shock was felt at Smyrna, at about 7.20 a. m., which lasted about fifteen seconds, and was followed by three lesser shocks in quick succession. The damage was greatest on the lower slopes of Mount Pegasus, where the vibrations were much more severe than along the plain between the hill and the shore. It was first reported that all the villages between Chesme and Vourla were completely wrecked, and that at least 2,000 persons lost their lives by being buried beneath the ruins of their dwellings, but later reports show that this statement was exaggerated. On the 22d it was reported that at Vourla, near Smyrna, where two hundred huts were wrecked, only two persons were killed and seven injured. Altogether there were fifty-seven persons killed and one hundred and fifty injured. These figures represent the total loss of life, although between 14,000 and 15,000 persons were rendered homeless, and were cared for by the authorities. At Chesme only twenty per cent. of the houses sustained damage, which in many cases was slight. Three shocks also occurred at that place on the 23d, which caused great alarm, but no damage was done. At Smyrna, on this date, another severe shock was felt at 9 p. m., which caused some damage, but no loss of life.

A despatch from Smyrna, on the 28th, states that another shock of earthquake was felt there on that date, which damaged the walls surrounding the town, as well as the aqueduct and morgue. At Vourla, more than two hundred persons were injured.

London, England, October 20th.—Three shocks of earthquake were felt, in quick succession, at Gibraltar, shortly after midnight, and a third shock was felt at 2 a. m. The duration of the shocks was from ten to twelve seconds and the direction was from north to south.

Madrid, Spain, October 30th.—A severe shock of earthquake, lasting three seconds, was felt on this date in the provinces of Cadiz and Huelva.

Hamilton, Bermuda, October 30th.—One of the severest shocks of earthquake ever felt here, occurred at about 1.15 p. m. of this date. The oscillation continued fully ten seconds, its direction being from west to east. The shock was felt throughout the island, but no damage was done.

Cape Mendocino, California.—A slight shock of earthquake is reported to have been felt here at 3.15 a. m., of the 16th. At 4.14 p. m., of the 24th, a severe shock occurred. The swaying of the buildings continued for about fifteen seconds, and indicated that the wave was from south-southwest to north-northeast.

Captain Trainer, of the bark "Ralph B. Peake," which arrived at New York, October 12th, from Bahia, Brazil, furnishes the following report:

At 5 a. m., of September 18, 1883, when in N. 18° 15', W. 21°, I was below in my bunk, when I was suddenly startled by a sudden shock which lasted about five minutes (? probably seconds). I thought we had struck a reef, so I rushed on deck, looked over the side, but saw no change in the color of the water to indicate that we were on a shoal. I had the lead cast and it ran out to sixty fathoms with no bottom. I then concluded that the disturbance was caused by an earthquake.

On October 3d, the s. s. "International," in N. 35° 18', W. 50° 16', felt a heavy shock under the vessel which resembled an explosion. The weather at the time was fine, and the sea was calm.

The following communication has been received from the Signal Service observer at Unalaska, Alaska:

UNALASKA, ALASKA, October 22, 1883.

EXECUTIVE OFFICER, Signal Service, U. S. A., Washington, D. C.

SIR: I forward by this mail a sample bottle of sand that fell during the storm of October 20, 1883.

At 2.30 p. m. the air became suddenly darkened like night, and soon after a shower of mixed sand and water fell for about ten minutes, covering the ground with a thin layer. The windows were so covered that it was impossible to see through them.

This sand is supposed to have come either from the Mukushin or the new volcano adjacent to Bogoslov. The former is a distance of about nineteen

miles southwest, but for years has only issued forth smoke or steam. The latter is a new one, which made its appearance this summer, and burst out from the bottom of Behring sea. It has been exceedingly active, as it has already formed an island from 800 to 1,200 feet high.

According to the report of Captain Anderson, the discoverer, who sails one of the Company's vessels, and who went within two thousand yards of it, it presents a most magnificent sight. The fire, smoke, and lava are coming out of many crevices, even under the water line. Large boulders are shot high in the air, which, striking the water, send forth steam and a hissing sound.

Bogoslov is about sixty miles from here, in a west direction. The new volcano is about one-eighth of a mile northwest of it.

I am, sir, very respectfully,

S. APPLGATE,
Sgt., Sig. Corps, U. S. A.

DROUGHT.

Louisville, Kentucky, 1st.—The long-continued drought was broken by the copious rain of this date.

Boston, Massachusetts, 2d.—The rain of this date was much needed in New England. The springs and streams in many localities were lower than they have been for the last twenty years. The corn and potato crops have been seriously affected by the drought.

Mobile, Alabama, 6th.—The wells in this city and vicinity are becoming exhausted. Along the Louisville & Nashville railroad the people are furnished with water from the tanks used for supplying the engines. The health authorities report the death rate to be increasing rapidly, and attribute it to the intensely hot and dry weather.

Montgomery, Alabama, 10th.—The prolonged and unprecedented drought continues. Owing to the low stage of water in the Alabama river, boats are prevented from reaching this city. The cisterns are becoming exhausted and the creeks in the surrounding country are very low, some of which have stopped running. In some localities water is hauled long distances for household uses.

Vicksburg, Mississippi, 13th.—Drought continues in this part of the state, and in consequence the water supply in this city has become nearly exhausted. It has been necessary to haul water from the river for several days.

New Orleans, Louisiana, 17th.—The heavy rain of this date ended the severe drought which has prevailed in this region.

Waterbury, Connecticut, 18th.—This city is threatened with serious water famine. On this date the city authorities restricted the factories in their demands on the water supply.

MIGRATION OF BIRDS.

Geese flying southward.—Fort Verde, Arizona, 9th; Yuma, Arizona, 12th; Lead Hill, Arkansas, 19th, 30th; Little Rock, Arkansas, 20th; Cape Mendocino, California, 20th; 28th; 29th, 31st; Red Bluff, California, 4th, 21st; Alexandria, Dakota, 19th, 29th, 30th; Fort Buford, Dakota, 9th; Huron, Dakota, 21st; Chicago, Illinois, 31st; Edgington, Illinois, 20th; Peoria, Illinois, 27th; Griffin Station, Indiana, 22d; Guttenburg, Iowa, 15th, 20th; Humboldt, Iowa, 14th; Allison, Kansas, 27th; Elk Falls, Kansas, 20th; Fort Scott, Kansas, 30th, 21st; Holton, Kansas, 18th, 19th; Independence, Kansas, 15th, 20th, 29th, 30th, 31st; Salina, Kansas, 8th; Topeka, Kansas, 30th; Yates Centre, Kansas, 15th, 16th, 19th, 20th; Mackinaw City, Michigan, 19th; Traverse City, Michigan, 28th, 30th; Saint Paul, Minnesota, 5th; De Soto, Nebraska, 8th; 30th; Genoa, Nebraska, 9th; Table Rock, Nebraska, 29th; Barnegat City, New Jersey, 4th; Factoryville, New York, 4th, 22d; Humphrey, New York, 23d; Mountainville, New York, 27th; New River Inlet, North Carolina, 28th; Portland, Oregon, 4th; Roseburg, Oregon, 25th, 26th, 27th; Chambersburg, Pennsylvania, 25th; Grampian Hills, Pennsylvania, 23d; Wellsboro', Pennsylvania, 22d, 30th, 31st; Narragansett Pier, Rhode Island, 2d; Point Judith, Rhode Island, 31st; Barnesville, Texas, 11th; Fort Elliott, Texas, 30th; Indianola, Texas, 20th; Palestine, Texas, 20th, 21st; Rio Grande City, Texas, 13th; Chincoteague, Virginia, 5th; Fort Myer, Virginia, 15th; Johnstown, Virginia, 30th; Lynchburg, Virginia, 15th; Norfolk, Virginia, 16th; Fort Canby,

Washington Territory, 28th; Embarras, Wisconsin, 16th; Sussex, Wisconsin, 13th, 21st, 22d, 26th. *Geese flying northward.*—San Francisco, California, 17th; Alexandria, Dakota, 10th; Edgington, Illinois, 29th; Springfield, Illinois, 28th; Yates Centre, Kansas, 30th. *Geese flying eastward.*—Curryville, Missouri, 30th; Lynchburg, Virginia, 21st. They appeared in large numbers at Little Rock, Arkansas, 14th; Fort Canby, Washington Territory, 25th. *Ducks flying southward.*—Little Rock, Arkansas, 20th, 29th; Alexandria, Dakota, 19th; Swanwick, Illinois, 30th; Fort Madison, Iowa, 20th, 30th; Fort Scott, Kansas, 19th, 20th, 21st, 29th, 30th, 31st; Elk Falls, Kansas, 20th; Yates Centre, Kansas, 20th; Curryville, Missouri, 29th; Factoryville, New York, 22d; Mountainville, New York, 31st; Palermo, New York, 25th; Cape Lookout, North Carolina, 16th; Portsmouth, North Carolina, 9th, 17th; Canal Dover, Ohio, 20th; Wellsboro', Pennsylvania, 31st; Narragansett Pier, Rhode Island, 2d; Memphis, Tennessee, 20th; Indianola, Texas, 11th, 16th, 20th, 26th, 29th, 30th, 31st; Palestine, Texas, 20th, 31st; Norfolk, Virginia, 16th; Sussex, Wisconsin, 8th, 27th. *Ducks flying northward.*—Edgington, Illinois, 22d; Springfield, Illinois, 28th; Memphis, Tennessee, 20th; Woodstock, Vermont, 25th. *Ducks flying eastward.*—Little Rock, Arkansas, 30th; Edgington, Illinois, 11th, 19th; Dubuque, Iowa, 20th; Woodstock, Vermont, 25th. *Ducks flying westward.*—Yates Centre, Kansas, 30th; Wauseon, Ohio, 31st. They appeared in large numbers at Fort Smith, Arkansas, 25th; Little Rock, Arkansas, 14th. *Cranes flying southward.*—Humboldt, Iowa, 29th; Indianola, Iowa, 31st; Independence, Kansas, 30th, 31st; Albany, Oregon, 1st; Portland, Oregon, 7th; Barnesville, Texas, 31st.

At Palestine, Texas, brants were observed flying southward on the 16th; Little Rock, Arkansas, brants appeared in large numbers on the 16th, and were observed flying eastward on the 30th.

At Vermillion, Dakota, swans were observed flying southward on the 30th.

POLAR BANDS.

Lead Hill, Arkansas, 14th, 29th, 30th, 31st.
Cape Mendocino, California, 30th.
Los Angeles, California, 11th, 20th, 21st.
Washington, District of Columbia, 5th.
Archer, Florida, 3d, 4th, 11th, 12th, 20th, 25th, 30th.
Riley, Illinois, 17th.
Guttenburg, Iowa, 18th, 21st.
Gardiner, Maine, 10th, 11th, 12th, 14th.
Somerset, Massachusetts, 6th.
Vineland, New Jersey, 18th.
Wauseon, Ohio, 4th.
Woodstock, Vermont, 8th.
Wytheville, Virginia, 7th, 14th, 28th.

PRAIRIE AND FOREST FIRES.

Mobile, Alabama, 12th.—Woods on fire in north and the air is filled with smoke.
Alexandria, Dakota, 18th, 30th.
Fort Buford, Dakota, 2d.
Huron, Dakota, 26th, 29th, 30th, 31st.
Fort Totten, Dakota, 1st, 26th.
Yankton, Dakota, 20th, 22d, 29th.
Humboldt, Iowa, 18th, 26th, 29th.
Saint Vincent, Minnesota, 24th to 28th.

ZODIACAL LIGHT.

Little Rock, Arkansas, 29th, 30th, 31st.
Los Angeles, California, 18th, 19th, 28th, 29th, 30th.
Santa Barbara, California, 17th to 20th.
Pensacola, Florida, 27th, to 31st.
Cambridge, Massachusetts, observed on the 4th; suspected on the 26th, and 30th.
Nashville, Tennessee, 17th, 20th, 29th, 30th, 31st.
Palestine, Texas, 1st, 5th.
Lynchburg, Virginia, 30th.

WATER-SPOUTS.

Key West, Florida.—At 4.45 p. m., of the 1st, three separate and distinct water-spouts were observed about six miles northwest of this place. They were moving toward the southwest, and were visible until 5.15 p. m.

SAND STORMS.

Los Angeles, California, 26th.
Yuma, Arizona, 7th, 16th, 25th, 26th.

NOTES AND EXTRACTS.

IOWA WEATHER BULLETIN FOR OCTOBER, 1883.

October, 1883, was cold, cloudy, and rainy, easterly and northeasterly winds prevailing. Hardly any snow fell.

The mean temperature of the air was fully two degrees below normal, yet during the past forty-five years October has been as cold or colder fifteen times, averaging one in three years. The middle decade was coldest, nearly three and a half degrees below normal. October in 1843, '53, '63, and '73 was as cold, or colder, as October, 1883.

The mean cloudiness was twenty per cent. above normal. The number of cloudy days was about equal to the normal number of clear days. Insolation was therefore low, fine sunny days but few, and really severe frosts did not occur.

The number of days with rainfall was very high in eastern and southern Iowa; much less so in the north and west; ranging from ten to seventeen in the former and from five to nine in the latter part. The total amount of rainfall was about normal in the north, but fully double the normal amount in southern and middle Iowa. The lowest rainfall, only about half an inch, fell in Hancock and Kossuth counties, while the highest rainfall, of about six inches, is reported from Wayne to Lee counties. On the whole, two out of every five years have, during the past thirty-five years, brought as much rainfall in middle eastern Iowa during the month of October.

Fogs were frequent and extended, especially on the 6th and 28th. Fine, hazy weather occurred on only a few days.

During the thunderstorm of the 1st the rainfall was heaviest in middle eastern Iowa, while the storm of the 17th gave most rain to the west and northwest. No measurable amount of snow fell in the southern half of Iowa.

No tornadoes occurred in Iowa during this month, though on the 8th, in Iowa the hottest day of the month, a tornado visited Arcadia, in Wisconsin, and on the 29th another tornado traversed a part of Louisiana. In Iowa tornadoes have not occurred between November 1st and April 1st. Sun spots continue very numerous and large.

GUSTAVUS HINRICHS.

CENTRAL STATION, I. W. S., November 8, 1883.

REPORT OF THE MISSOURI WEATHER SERVICE, OCTOBER, 1883.

The temperature of October has been 55° 9, which is the normal October value for Saint Louis, but the rainfall, which measured 6.0 inches, was twice the normal fall. This has been exceeded but five times since 1839, the greatest fall observed having been 8.74 inches in 1847.

The rainfall has also been in excess over the entire state. The least rain occurred in a small area along the Mississippi river between Louisiana and the mouth of the Missouri, the minimum fall of 3.92 inches having occurred at Louisiana. At Hannibal, however, the rainfall was 8.0 inches. An area of maximum fall of over eight inches occurred between Hannibal, Macon, and Moberly, in which the greatest fall, of 9.9 inches is reported from Shelby. In the southern part of the state the rainfall has also exceeded eight inches, the greatest rainfall in the state, 11.76, being reported from Carthage.

The minimum temperature at Central Station was 35° 7, or nearly four degrees above the freezing point. At Booneville, Centerville, Keokuk, Iowa, Kirksville, Macon, Mexico, and Oregon, the temperature fell to or below 32° Fahr., the lowest being 28° at Oregon. The highest temperatures reported were 89° at Glasgow and Ironton. A temperature of 98° reported from Bolivar is probably due to an improper exposure of the thermometer, as a temperature of 94° is also recorded on the 6th and 9th and of 96° on the 7th.

A remarkable number of local thunder storms were observed. Ironton reports eight with sixteen rainy days; Centerville, eight with seventeen rainy days; Chamois, nine with eleven rainy days. The greatest number of rainy days, however, was observed at Oregon, numbering twenty-three, of which only two were thunder storms. Of twenty-seven stations reporting the number of rainy days twenty-three report ten or more days of rain.

In giving the time of beginning and ending of rains, each should be recorded under its proper date. If the beginning and ending are on different dates, one being before and the other after midnight, the entries should be on successive horizontal lines in the blank.

Most of the observers have adopted the twenty-four hour system of naming the hours, as requested in the special circular with the last report. It is earnestly requested that all will do so, as it greatly simplifies the work of studying the reports.

This report has been delayed in order to secure the accompanying new map with the present issue.

FRANCIS NIPHER,
Director.

Washington University, November 12, 1883.